



United States
Department of
Agriculture

Forest
Service

Plumas
National
Forest

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File Code: 2540

Date: DEC 8 2003

Mr. Steve Rosenbaum
California Regional Water Quality Control Board -
Central Valley Region
3443 Routier Road, Suite A
Sacramento, CA 95827-3003

Dear Mr. Rosenbaum,

Please find attached two reports required by Waste Discharge Requirements Order No. 5-00-028 for the U.S. Department of Agriculture, Forest Service, Plumas National Forest, at the Walker Mine Tailings in Plumas County. The reports are (1) Quarterly Monitoring Report for September 2003 and (2) the annual Monitoring Report. All samples were transported to Henrici Water Laboratory near Quincy for analysis. The Henrici laboratory sent a portion of these samples to Twining Laboratories, Inc. in Bakersfield, California for metals analyses.

The 2001 Amended Record of Decision for the Walker Mine Tailings site provides for the diversion of Dolly Creek around the tailings material. A contract has been awarded to Ecology and Environment, Inc. of San Francisco for the design of this diversion channel. E&E's design work is nearing completion and construction of the channel is planned for 2004 or 2005. The second installment of in-stream bio-assessment sampling was performed this fall and the collected macroinvertebrate and periphyton samples will be analyzed by certified labs over the coming weeks. Negotiations with the Atlantic Richfield Company (ARCO), a Potentially Responsible Party, over remediation costs are still pending.

Please call Joe Hoffman of this office at (530) 283-7868 if you have questions.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in the attached documents and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Sincerely,

JAMES M. PEÑA
Forest Supervisor



607530140



ANNUAL MONITORING REPORT

WDR Order Number: 5-00-028

Discharger: USDA Forest Service, Plumas National Forest

Facility: Walker Mine Tailings, Plumas County

Reporting Frequency: Annual Summary

Monitoring Period: Calendar Year 2003

Findings:

(1) Surface Water. Samples were collected during June, July, and September, as prescribed in the Waste Discharge Requirements. Adjusting for hardness at the Compliance Station (R-5), the calculated limitation for dissolved copper for the three sampling periods ranged from 3.1 ug/L to 7.1 ug/L; this limitation was exceeded during each of the sampled months (the average dissolved copper concentration at R-5 was 61 ug/L). The limitations for iron and zinc were not exceeded in any of the samples collected.

Small concentrations of dissolved copper (< 3.2 ug/L) were detected at R-3, the background station on Little Grizzly Creek, and R-4, Little Grizzly Creek above the confluence with Dolly Creek, during five of the six sampling events (see Table 1 and Map 1). Reviewing the 68 copper testing events from 1991 to present for R-3 and R-4 indicates no significant trends. The average dissolved copper concentration for the two sites over this period is strikingly similar (3.2 ug/L for both R-3 and R-4). Copper concentrations above the laboratory detection limits were found in the waters of Little Grizzly Creek above the confluence with Dolly Creek just 25% (R-3) and 28% (R-4) of the time. However, the concentrations found frequently do not follow the hypothesis that the copper concentration in Little Grizzly Creek is increasing as it flows past the tailings material. Only 16% of the sampling events show higher dissolved copper concentrations at R-4 than at R-3 and about half the time that copper is detected at R-3 it is not detected downstream at R-4. The lack of a discernible trend could be attributable to the inherent variability associated with stream grab samples and with the laboratory analysis of such low copper concentrations. There is little concrete explanation for the detection of copper at the R-3 station at all. The only apparent contamination of Little Grizzly Creek at that location is the occasional drift of tailings material blown by the wind into this upstream area. Even with this minor contamination pathway, it does not seem plausible that concentrations of copper in samples taken at R-3 could be detected.

In all three sampling events, dissolved copper was found at R-1, Dolly Creek above the tailings area, in concentrations that exceeded the limitations established for freshwater aquatic life protection. The results from the R-2 samples, Dolly Creek below the tailings area, confirm the tailings area as the primary source of copper to the receiving waters; over the three sampling events, the average increase in copper concentration from R-1 to R-2 amounted to 85% of the copper found at R-2 (see Table 2 and Chart 1). The reduction in copper concentrations between stations R-2 and R-5, the compliance station on Little Grizzly Creek, was 65% in June, 63% in July, and 70% in September. The 2003 water year was considered to be slightly below average for precipitation and runoff; table 3 displays flow rates for the three sampling periods from 1991 through 2003.

(2) Groundwater. As specified in the WDR, three monitoring wells (W-3, W-5, and W-7) were each sampled twice in 2003, in May and September (see Map 2). A summary of the test results of this year's sampling is compared to that performed in 1994, 1995, 2000 and 2001 (Table 4). All seven wells were sampled in 1994 and 1995 with four events in 1994 and two in 1995. The 2000, 2001 and 2002 testing schedules were identical to 2003 with wells W-3, W-5, and W-7 sampled in May and September.

The detection of dissolved copper or zinc is relatively rare in any of the wells. The most striking exceptions occurred at W-4 in August and September of 1994 when copper concentrations of 550 and 620 ug/L were measured. A smaller amount of dissolved copper (12 ug/L) was found in 2001 in W-3 sample but no dissolved copper or zinc was found in any of the other 2001 well samples. Similarly, no dissolved copper or zinc was found in the 2000 samples. For 2002, dissolved copper was detected in 3 of the 6 well samples with a maximum concentration of 2.1 ug/L. For 2003, dissolved copper was detected in 5 of the 6 well samples with a maximum concentration of 2.8 ug/L. Dissolved zinc concentrations were detected in four of the six well samples in 2003 with a maximum concentration of 5.6 ug/L.

Test results for total copper and zinc in the 1994 and 1995 samples indicate that these metals are present in the tailings material throughout the site. The characterization of the tailings material in 1992 by Westec confirmed the presence of these constituents throughout the tailings area. The characterization program included not only the seven monitoring wells, but also an additional seven boreholes.

One can basically conclude that even though copper and zinc are present in the tailings material throughout the site, they are not entering into solution (except along the Dolly Creek channel). This is confirmed by the surface water-sampling program, in which samples taken at the base of the tailings in Little Grizzly Creek (R-4) generally indicate that these constituents are at non-detectable levels. It's only after Little Grizzly Creek mixes with Dolly Creek that soluble copper and zinc are detected.

The same cannot be said about iron. Not only is dissolved iron frequently found in all of the wells, it is prevalent in nearly all surface waters sampled (refer to the January 7, 2000 summary report by the Forest Service, "Analysis of Surface Water Quality at the Walker

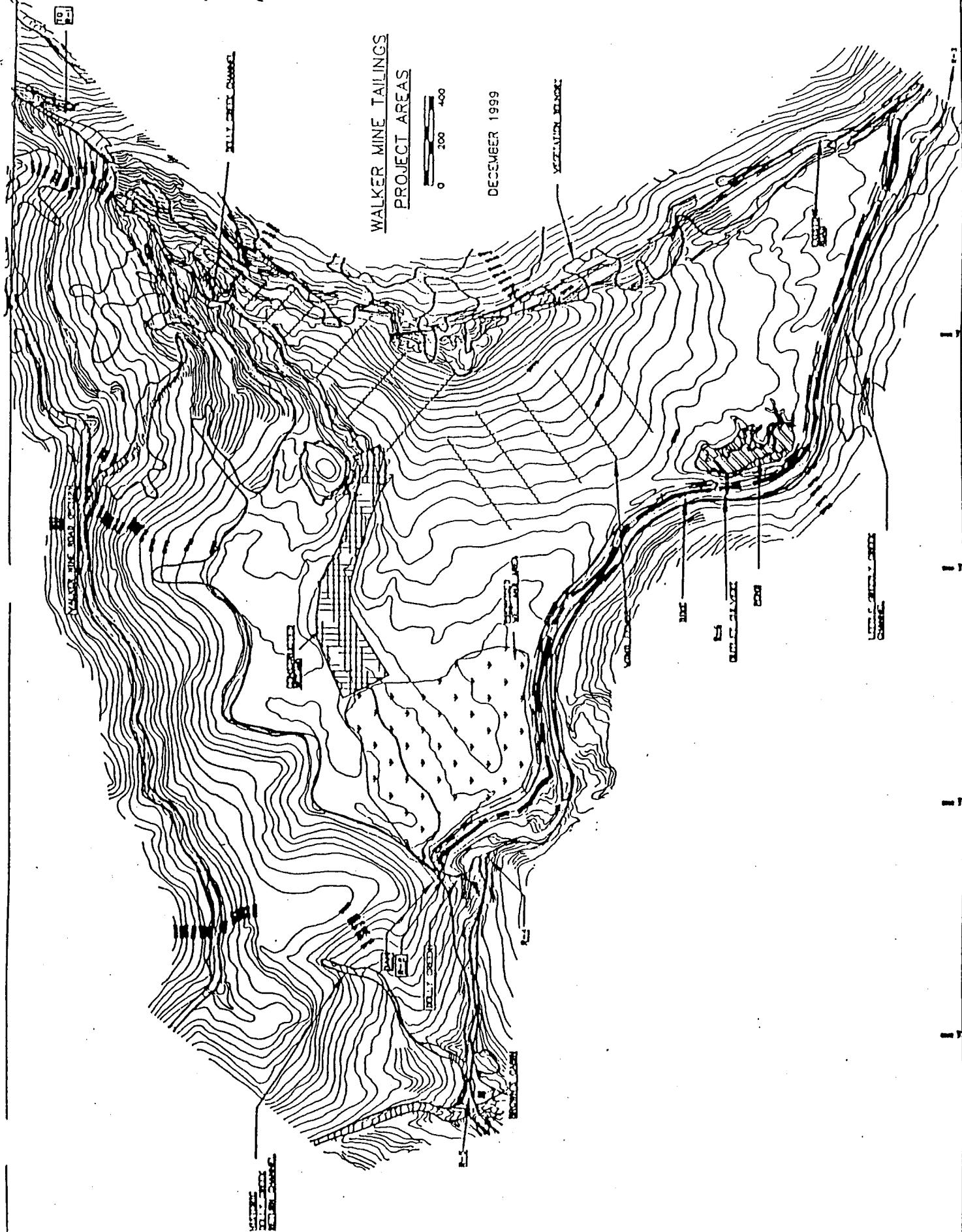
Mine Tailings, 1986-1999"). This includes both background stations, W-7 and R-3. Iron precipitates are readily seen all along Little Grizzly Creek where it flows along the base of the tailings and in the Dolly Creek channel as it flows across the tailings area. Iron precipitates can also be found in both channels above and below the tailings area. Curiously, dissolved iron was not found in any of the six well samples in 2003.

The water level in each well was measured in 2003 during both sampling events, May and September. A map displaying the groundwater flow gradient and direction was produced for each event (Maps 3 and 4). Generally, the groundwater in the tailings area drains in two directions, towards the tailings dam near the end of Dolly Creek and towards the settling pond near R-6. The groundwater gradient steepens by the end of the summer season, dropping nearly five feet at the dam and ten feet at the settling pond.

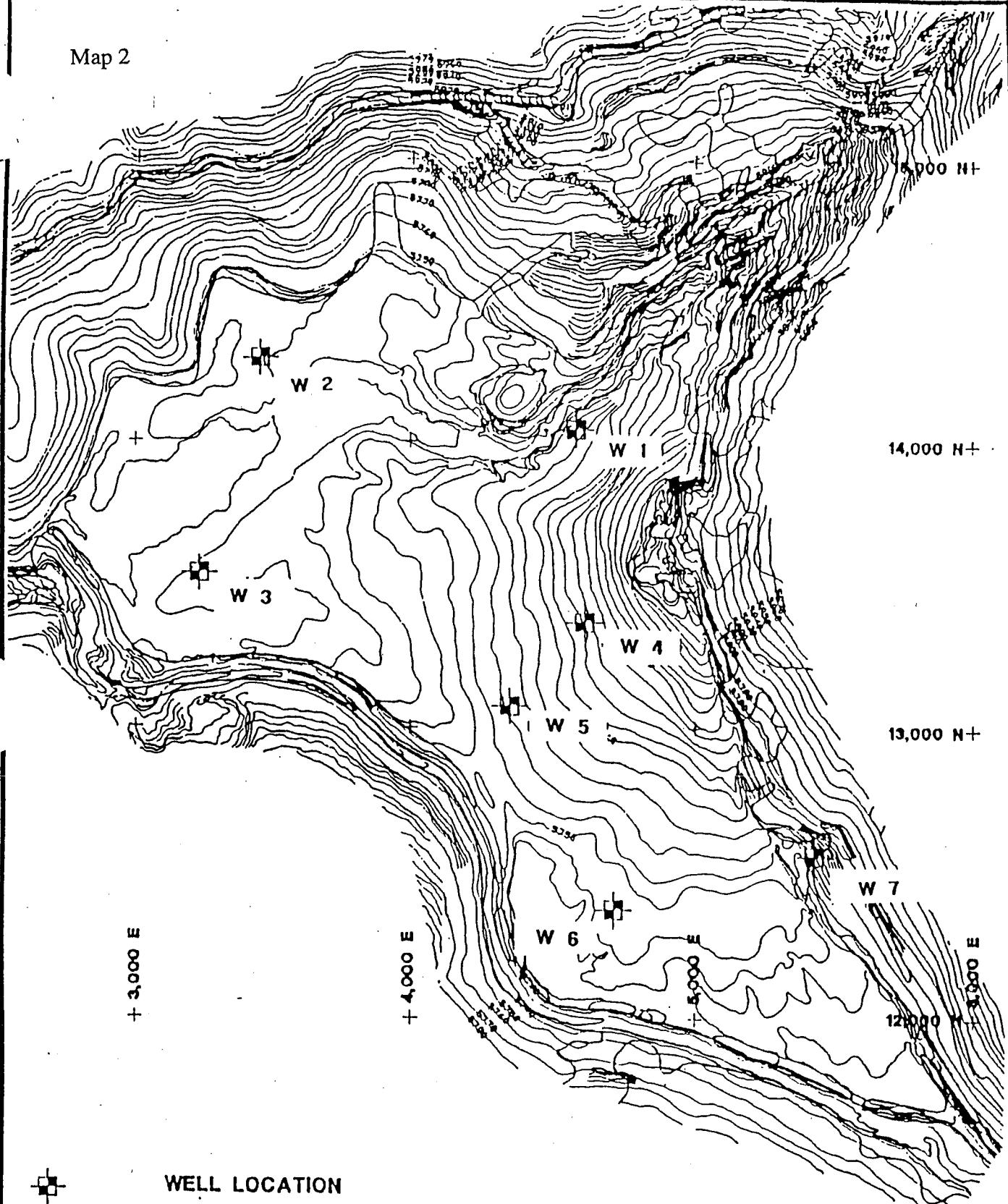
Table 5 lists the measured groundwater depths for the years in which this data has been collected (1993, 1994, 1995, 2000, 2001, 2002 and 2003). Groundwater elevations at W-3 are important to look at from the standpoint of the proposed anaerobic wetland. The depth to water in 2002 dropped from 3.9 feet to 6.1 feet from May to September. The depth to groundwater at W-3 averages 5.5 feet and the seasonal water table drop is typically about two feet. Except for the driest year since monitoring began, water appears to flow over the tailings dam at all times; in August 1992, Dolly Creek flows did not reach the tailings dam during the heat of the day.

(3) Channel Substrate Analysis (Pebble Count). One of the measured changes that should occur as a result of rehabilitating the tailings area is a decreased transport of tailings material to Little Grizzly Creek. Though most of the material moves during times of high flows when sampling does not normally occur, evidence of its occurrence should be measurable by analyzing channel substrate size classes. The current WDR requires that a "Wolman pebble count" be conducted once a year in the fall. A complete discussion of the results of the third pebble count, conducted in October 2003, can be found in that report. Essentially, the analysis found that some tailings material is depositing at the compliance station, R-5. This same material is not found upstream near the R-6 station.

Map 1

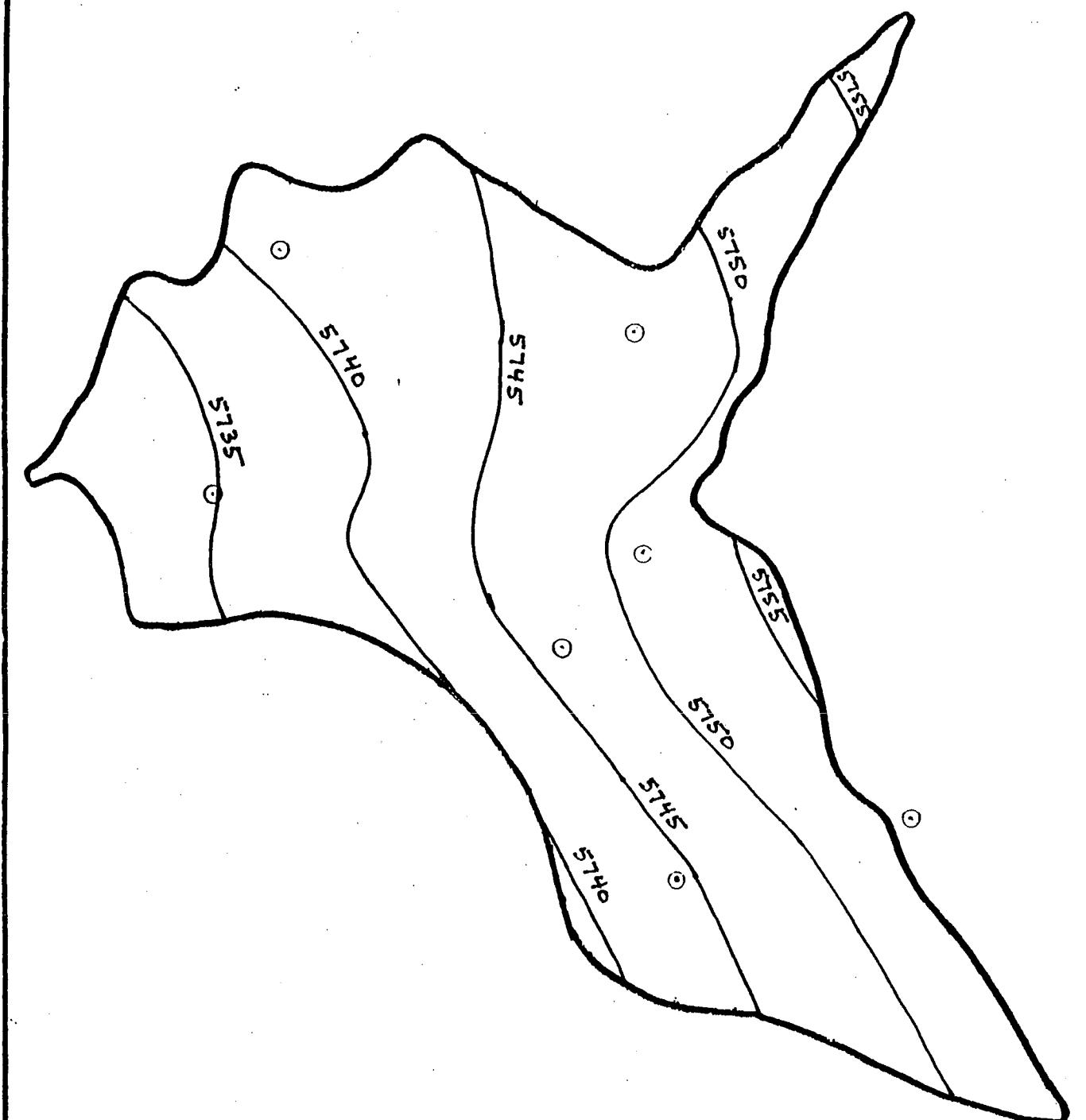


Map 2



WALKER MINE TAILINGS

Map 3



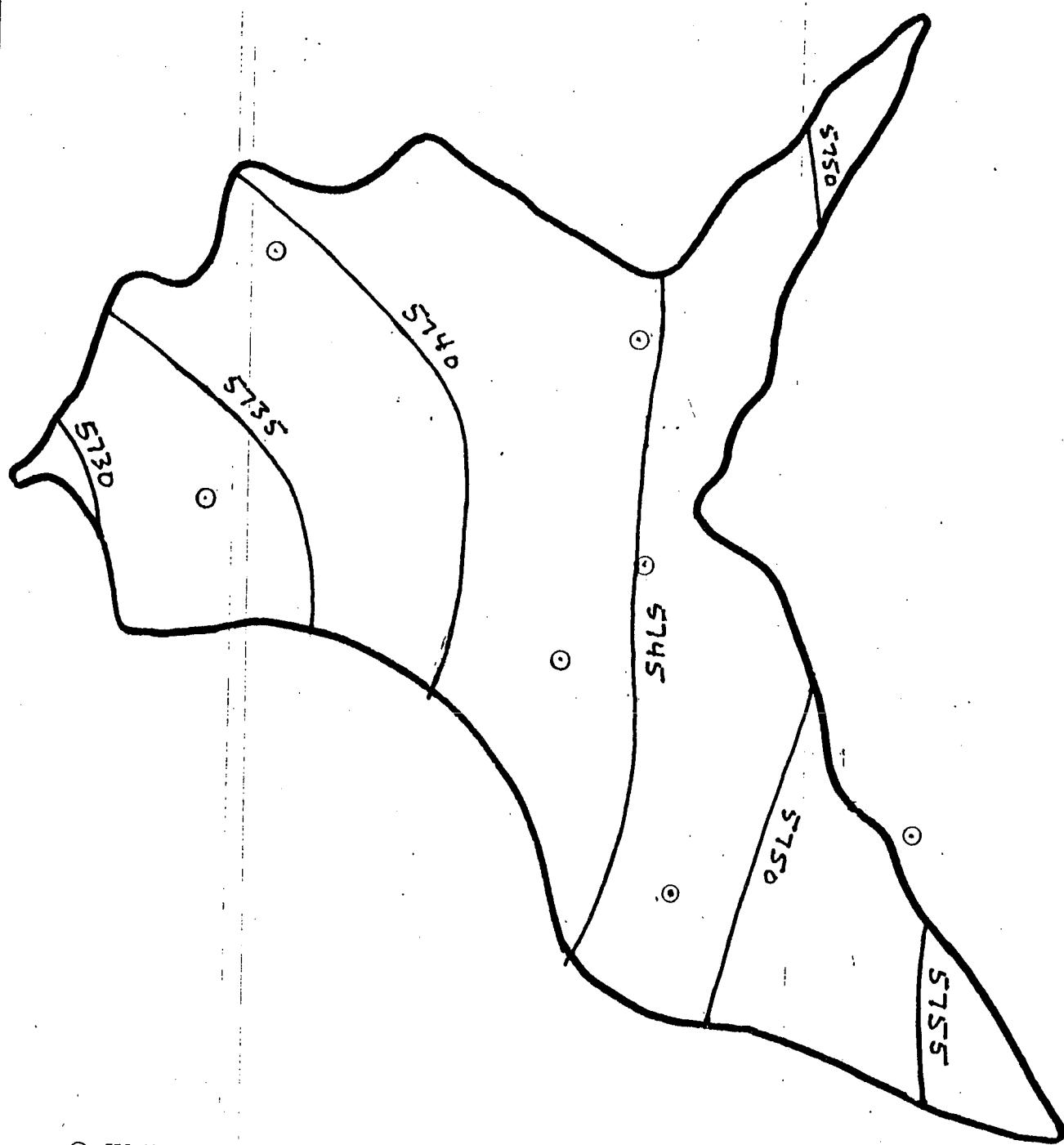
① Well Location
5740 Groundwater Elevation Isopleth

Scale: 1" = 500'

WALKER MINE TAILINGS
GROUNDWATER CONTOUR MAP

May 2003

Map 4



○ Well Location
~~~~ Groundwater Elevation Isopleth

Scale: 1" = 500'

WALKER MINE TAILINGS  
GROUNDWATER CONTOUR MAP

September 2003

**Copper Concentrations at R-3 and R-4**  
**Little Grizzly Creek Above and Below Walker Tailings**

Table 1

| Date    | R-3<br>Copper<br>mg/L | R-4<br>Copper<br>mg/L | Date    | R-3<br>Copper<br>mg/L | R-4<br>Copper<br>mg/L |
|---------|-----------------------|-----------------------|---------|-----------------------|-----------------------|
| May 91  | 0                     | 0.0020                | May 00  | 0                     | 0                     |
| Jun 91  | 0                     | 0                     | Jul 00  | 0.0230                | 0                     |
| Jul 91  | 0                     | 0                     | Sep 00  | 0                     | 0                     |
| Aug 91  | 0                     | 0.0030                | May 01  | 0                     | 0                     |
| Sep 91  | 0                     | 0                     | Jul 01  | 0                     | 0                     |
| Oct 91  | 0                     | 0                     | Sep 01  | 0                     | 0                     |
| Nov 91  | 0                     | 0                     | May 02  | 0.0051                | 0                     |
| Dec 91  | 0                     | 0.0030                | Jul 02  | 0.0039                | 0.0013                |
| Apr 92  | 0                     | 0                     | Sep 02  | 0                     | 0.0037                |
| May 92  | 0                     | 0.0390                | June 03 | 0.0017                | 0.0013                |
| Jun 92  | 0.0039                | 0                     | Jul 03  | 0                     | 0.0027                |
| Jul 92  | 0                     | 0                     | Sep 03  | 0.0032                | 0.0010                |
| Aug 92  | 0.0036                | 0                     |         |                       |                       |
| Sep 92  | 0.1200                | 0.1200                |         |                       |                       |
| Oct 92  | 0                     | 0.0024                | x       | 0.0032                | 0.0032                |
| Nov 92  | 0                     | 0                     | n       | 68                    | 68                    |
| May 93  | 0                     | 0                     | s       | 0.0148                | 0.0152                |
| Jun 93  | 0.0028                | 0                     | max     | 0.1200                | 0.1200                |
| Jul 93  | 0.0024                | 0.0070                | min     | ND                    | ND                    |
| Aug 93  | 0                     | 0                     |         |                       |                       |
| Sep 93  | 0                     | 0.0083                |         |                       |                       |
| Oct 93  | 0                     | 0                     |         |                       |                       |
| Nov 93  | 0                     | 0.0040                |         |                       |                       |
| May 94  | 0                     | 0                     |         |                       |                       |
| Jun 94  | 0.0090                | 0.0057                |         |                       |                       |
| Jul 94  | 0                     | 0                     |         |                       |                       |
| Aug 94  | 0                     | 0                     |         |                       |                       |
| Sep 94  | 0                     | 0                     |         |                       |                       |
| Oct 94  | 0                     | 0                     |         |                       |                       |
| Jun 95  | 0                     | 0                     |         |                       |                       |
| Jul 95  | 0                     | 0                     |         |                       |                       |
| Aug 95  | 0.0041                | 0                     |         |                       |                       |
| Sep 95  | 0                     | 0                     |         |                       |                       |
| Oct 95  | 0                     | 0                     |         |                       |                       |
| Nov 95  | 0                     | 0.0023                |         |                       |                       |
| May 96  | 0                     | 0                     |         |                       |                       |
| June 96 | 0                     | 0                     |         |                       |                       |
| July 96 | 0.0029                | 0                     |         |                       |                       |
| Aug 96  | 0.0022                | 0                     |         |                       |                       |
| Sept 96 | 0                     | 0                     |         |                       |                       |
| May 97  | 0                     | 0                     |         |                       |                       |
| June 97 | 0                     | 0                     |         |                       |                       |
| July 97 | 0                     | 0                     |         |                       |                       |
| Aug 97  | 0                     | 0                     |         |                       |                       |
| Sept 97 | 0                     | 0                     |         |                       |                       |
| Oct 97  | 0                     | 0                     |         |                       |                       |
| June 98 | 0                     | 0                     |         |                       |                       |
| July 98 | 0.0110                | 0.0034                |         |                       |                       |
| Aug 98  | 0.0046                | 0.0015                |         |                       |                       |
| Sept 98 | 0                     | 0                     |         |                       |                       |
| Oct 98  | 0.0130                | 0.0088                |         |                       |                       |
| Jun 99  | 0                     | 0                     |         |                       |                       |
| Jul 99  | 0                     | 0                     |         |                       |                       |
| Aug 99  | 0                     | 0                     |         |                       |                       |
| Sept 99 | 0                     | 0                     |         |                       |                       |
| Oct 99  | 0                     | 0                     |         |                       |                       |

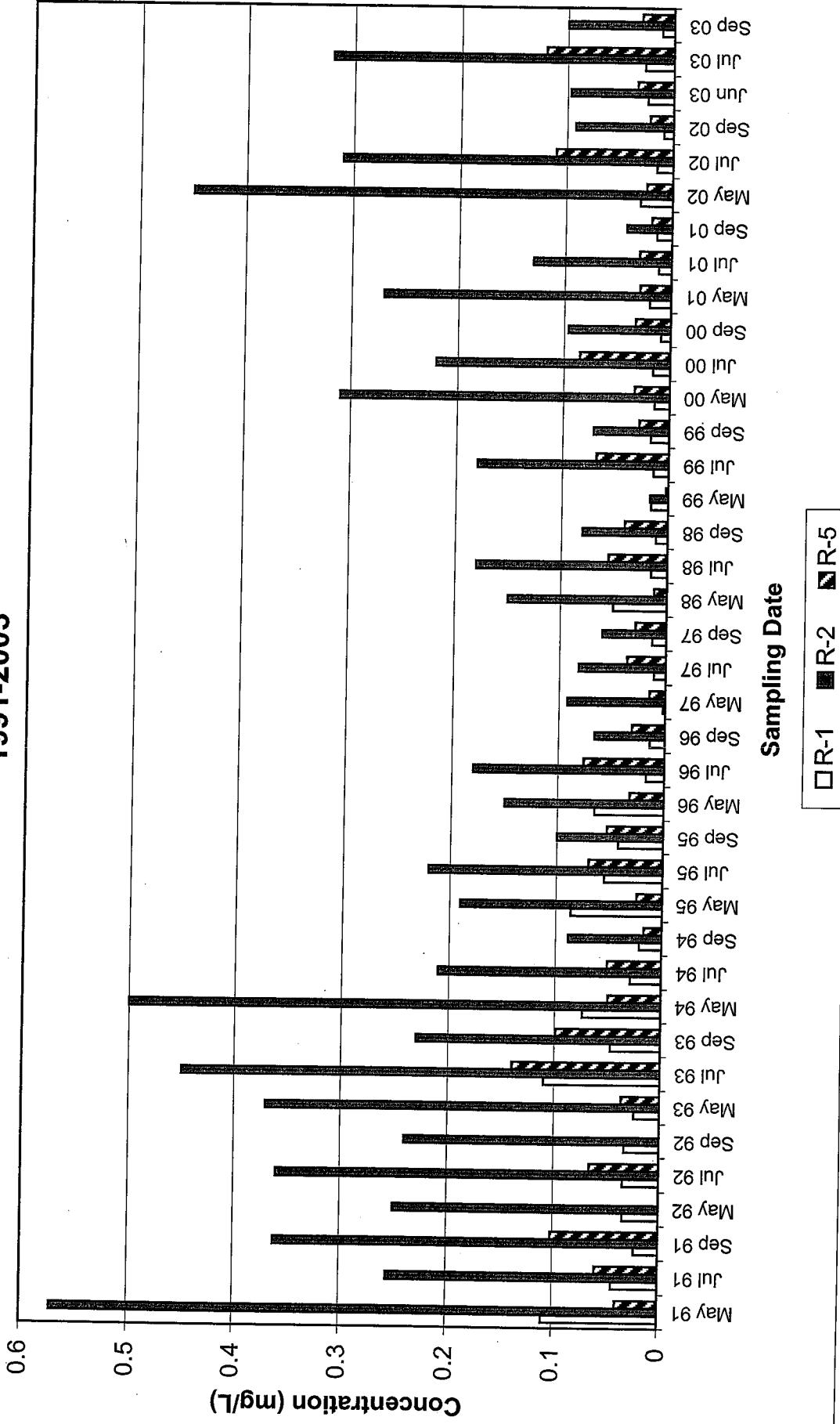
**Summary of Copper Data for R-1, R-2 and R-5**  
**1991-2003**

**Table 2**

| Year | R-1 Cu Conc. (mg/L) |       |           | R-2 Cu Conc. (mg/L) |       |           | R-5 Cu Conc. (mg/L) |       |           |
|------|---------------------|-------|-----------|---------------------|-------|-----------|---------------------|-------|-----------|
|      | May/June            | July  | September | May/June            | July  | September | May/June            | July  | September |
| 1991 | 0.110               | 0.044 | 0.023     | 0.572               | 0.256 | 0.362     | 0.040               | 0.060 | 0.102     |
| 1992 | 0.034               | 0.034 | 0.033     | 0.250               | 0.360 | 0.240     | 0.000               | 0.066 | 0.000     |
| 1993 | 0.024               | 0.110 | 0.047     | 0.370               | 0.450 | 0.230     | 0.036               | 0.140 | 0.099     |
| 1994 | 0.074               | 0.029 | 0.021     | 0.500               | 0.210 | 0.088     | 0.050               | 0.051 | 0.017     |
| 1995 | 0.086               | 0.055 | 0.042     | 0.190               | 0.220 | 0.100     | 0.024               | 0.070 | 0.053     |
| 1996 | 0.065               | 0.017 | 0.014     | 0.150               | 0.180 | 0.066     | 0.032               | 0.076 | 0.031     |
| 1997 | 0.002               | 0.011 | 0.013     | 0.092               | 0.082 | 0.060     | 0.015               | 0.036 | 0.029     |
| 1998 | 0.050               | 0.015 | 0.011     | 0.150               | 0.180 | 0.080     | 0.012               | 0.055 | 0.040     |
| 1999 | 0.016               | 0.014 | 0.017     | 0.017               | 0.180 | 0.071     | 0.002               | 0.068 | 0.028     |
| 2000 | 0.014               | 0.016 | 0.009     | 0.310               | 0.220 | 0.096     | 0.033               | 0.085 | 0.033     |
| 2001 | 0.020               | 0.012 | 0.014     | 0.270               | 0.130 | 0.042     | 0.029               | 0.030 | 0.019     |
| 2002 | 0.030               | 0.015 | 0.009     | 0.450               | 0.310 | 0.092     | 0.024               | 0.110 | 0.022     |
| 2003 | 0.024               | 0.027 | 0.011     | 0.097               | 0.320 | 0.100     | 0.034               | 0.120 | 0.030     |
| x    | 0.04                | 0.03  | 0.02      | x                   | 0.26  | 0.24      | 0.13                | x     | 0.07      |
| n    | 13                  | 13    | 13        | n                   | 13    | 13        | n                   | 13    | 13        |
| s    | 0.03                | 0.03  | 0.01      | s                   | 0.17  | 0.10      | 0.09                | s     | 0.03      |
| max  | 0.110               | 0.110 | 0.047     | max                 | 0.572 | 0.450     | 0.362               | max   | 0.140     |
| min  | 0.002               | 0.011 | 0.009     | min                 | 0.017 | 0.082     | 0.042               | min   | ND        |

**Copper Concentrations at R-1, R-2, & R-5  
Dolly Creek and Little Grizzly Creek  
1991-2003**

**Chart 1**



**Summary of Flow Rates at R-1, R-2 and R-5  
1991-2003**

**Table 3**

| Year | R-1 Flow Rate (cfs) |      |           | R-2 Flow Rate (cfs) |       |           | R-5 Flow Rate (cfs) |        |           |
|------|---------------------|------|-----------|---------------------|-------|-----------|---------------------|--------|-----------|
|      | May/June            | July | September | May/June            | July  | September | May/June            | July   | September |
| 1991 | 0.88                | 0.52 | 0.60      | 1.28                | 0.31  | 0.28      | 19.62               | 0.84   | 1.35      |
| 1992 | 0.18                | 0.14 | 0.11      | 0.12                | 0.06  | 0.02      | 1.06                | 0.43   | 0.22      |
| 1993 | 7.28                | 1.31 | 0.73      | 7.28                | 1.25  | 0.57      | 46.10               | 3.53   | 1.10      |
| 1994 | 0.31                | 0.14 | 0.14      | 0.72                | 0.15  | 0.01      | 7.30                | 0.45   | 0.44      |
| 1995 | 6.97                | 2.48 | 1.05      | 8.22                | 2.38  | 2.01      | 97.20               | 7.46   | 1.88      |
| 1996 | 12.30               | 1.10 | 0.90      | 15.60               | 1.30  | 1.00      | 80.90               | 3.40   | 1.70      |
| 1997 | 5.05                | 1.24 | 0.66      | 5.69                | 1.18  | 0.86      | 54.09               | 1.43   | 1.34      |
| 1998 | 9.60                | 1.80 | 1.00      | 10.20               | 2.00  | 0.90      | 120.00              | 7.10   | 2.10      |
| 1999 | 5.24                | 1.30 | 0.78      | 5.74                | 1.13  | 0.72      | 34.97               | 3.74   | 1.35      |
| 2000 | 2.00                | 0.70 | 0.40      | 2.20                | 0.70  | 0.40      | 23.40               | 2.10   | 1.00      |
| 2001 | 0.44                | 0.18 | 0.24      | 0.42                | 0.13  | 0.28      | 3.99                | 0.52   | 0.73      |
| 2002 | 1.25                | 0.37 | 0.34      | 1.62                | 0.31  | 0.18      | 18.13               | 1.12   | 0.56      |
| 2003 | 3.41                | 0.77 | 0.45      | 3.78                | 0.75  | 0.38      | 22.05               | 1.67   | 1.20      |
| X    | 4.22                | 0.93 | 0.57      | X                   | 4.84  | 0.90      | X                   | 40.68  | 2.60      |
| n    | 13                  | 13   | n         | 13                  | 13    | n         | 13                  | 13     | 13        |
| s    | 3.92                | 0.70 | 0.32      | s                   | 4.59  | 0.73      | s                   | 37.61  | 2.38      |
| max  | 12.30               | 2.48 | 1.05      | max                 | 15.60 | 2.38      | max                 | 120.00 | 7.46      |
| min  | 0.18                | 0.14 | 0.11      | min                 | 0.12  | 0.06      | min                 | 1.06   | 0.43      |

**GROUNDWATER QUALITY AT WALKER MINE TAILINGS**  
**1994-2003**

Table 4

| Well No. | Sample Date | Copper       |                 | Iron         |                 | Zinc         |                 |
|----------|-------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|
|          |             | Total (mg/L) | Filtered (mg/L) | Total (mg/L) | Filtered (mg/L) | Total (mg/L) | Filtered (mg/L) |
| W-1      | 08/24/1994  | 0.33         | ND              | 73           | 0.22            | 0.07         | ND              |
| W-1      | 09/22/1994  | 0.22         | ND              | 65           | 0.1             | 0.05         | ND              |
| W-1      | 10/25/1994  | 0.3          | ND              | 68           | 1.3             | 0.05         | ND              |
| W-1      | 06/24/1995  | ND           | ND              | 0.3          | 0.3             | ND           | ND              |
| W-1      | 11/13/1995  | 0.24         | ND              | 44           | 0.51            | 0.05         | 0.01            |
| W-2      | 08/24/1994  | 0.28         | ND              | 21           | 0.18            | ND           | ND              |
| W-2      | 09/22/1994  | 0.18         | ND              | 18           | 0.87            | ND           | ND              |
| W-2      | 10/25/1994  | 0.21         | ND              | 16           | 1.1             | ND           | ND              |
| W-2      | 06/24/1995  | ND           | ND              | 0.5          | 0.5             | ND           | ND              |
| W-2      | 11/13/1995  | 0.13         | ND              | 17           | 0.06            | ND           | ND              |
| W-3      | 07/18/1994  | 0.02         | -               | 1.4          | -               | ND           | -               |
| W-3      | 08/24/1994  | 0.02         | ND              | 1.4          | ND              | ND           | ND              |
| W-3      | 09/22/1994  | ND           | ND              | 0.73         | 0.17            | ND           | ND              |
| W-3      | 10/25/1994  | ND           | ND              | 1.1          | 0.70            | ND           | ND              |
| W-3      | 06/24/1995  | ND           | ND              | 1.6          | ND              | ND           | ND              |
| W-3      | 11/13/1995  | ND           | ND              | 0.36         | 0.04            | ND           | ND              |
| W-3      | 05/24/2000  | -            | ND              | -            | 0.021           | ND           | ND              |
| W-3      | 09/13/2000  | -            | ND              | -            | ND              | ND           | ND              |
| W-3      | 05/22/2001  | -            | ND              | -            | ND              | -            | ND              |
| W-3      | 09/25/2001  | -            | 0.012           | -            | ND              | -            | ND              |
| W-3      | 05/10/2002  | -            | ND              | -            | ND              | -            | ND              |
| W-3      | 09/26/2002  | -            | 0.0021          | -            | ND              | -            | ND              |
| W-3      | 05/23/2003  | -            | 0.0020          | -            | ND              | -            | 0.0032          |
| W-3      | 09/18/2003  | -            | 0.0025          | -            | ND              | -            | ND              |
| W-4      | 08/24/1994  | 0.89         | 0.55            | 93           | 0.41            | 0.08         | 0.04            |
| W-4      | 09/22/1994  | 1.7          | 0.62            | 120          | 0.41            | 0.15         | 0.05            |
| W-4      | 10/25/1994  | 0.98         | ND              | 100          | 32              | 0.12         | ND              |
| W-4      | 06/24/1995  | ND           | ND              | 28           | 28              | ND           | ND              |
| W-4      | 11/13/1995  | ND           | ND              | 47           | 25              | ND           | ND              |
| W-5      | 07/18/1994  | 0.11         | -               | 32           | -               | ND           | -               |
| W-5      | 08/24/1994  | 0.04         | ND              | 31           | 0.1             | ND           | ND              |
| W-5      | 09/22/1994  | 0.05         | ND              | 30           | ND              | ND           | ND              |
| W-5      | 10/25/1994  | 0.06         | ND              | 32           | 2.2             | ND           | ND              |
| W-5      | 06/24/1995  | ND           | ND              | 2.5          | 1.9             | ND           | ND              |
| W-5      | 11/13/1995  | ND           | ND              | 17           | 0.15            | ND           | ND              |
| W-5      | 05/24/2000  | -            | ND              | -            | 0.068           | ND           | ND              |
| W-5      | 09/13/2000  | -            | ND              | -            | 0.74            | ND           | ND              |
| W-5      | 05/22/2001  | -            | ND              | -            | 1.2             | -            | ND              |
| W-5      | 09/25/2001  | -            | ND              | -            | ND              | -            | ND              |
| W-5      | 05/10/2002  | -            | ND              | -            | 0.14            | -            | ND              |
| W-5      | 09/26/2002  | -            | 0.0013          | -            | 0.12            | -            | ND              |
| W-5      | 05/23/2003  | -            | 0.0015          | -            | ND              | -            | ND              |
| W-5      | 09/18/2003  | -            | 0.0028          | -            | ND              | -            | 0.0056          |
| W-6      | 08/24/1994  | 0.46         | ND              | 14           | ND              | 0.04         | ND              |
| W-6      | 09/22/1994  | 0.99         | 0.01            | 31           | 0.69            | 0.08         | ND              |
| W-6      | 10/25/1994  | 0.72         | 0.01            | 23           | 0.27            | 0.02         | ND              |
| W-6      | 06/24/1995  | ND           | ND              | ND           | ND              | ND           | ND              |
| W-6      | 11/13/1995  | 0.09         | ND              | 3.9          | 0.06            | ND           | ND              |
| W-7      | 07/18/1994  | ND           | ND              | 1.9          | -               | 0.02         | -               |
| W-7      | 08/24/1994  | 0.02         | ND              | 30           | 0.45            | 0.05         | ND              |
| W-7      | 09/22/1994  | 0.04         | ND              | 43           | 0.96            | 0.07         | ND              |
| W-7      | 10/25/1994  | 0.04         | ND              | 52           | 1.1             | 0.06         | ND              |
| W-7      | 06/24/1995  | ND           | ND              | ND           | ND              | ND           | ND              |
| W-7      | 11/13/1995  | 0.01         | ND              | 14           | 0.67            | 0.02         | 0.01            |
| W-7      | 05/24/2000  | -            | ND              | -            | 0.079           | -            | ND              |
| W-7      | 09/13/2000  | -            | ND              | -            | 0.18            | -            | ND              |
| W-7      | 05/22/2001  | -            | ND              | -            | 0.14            | -            | ND              |
| W-7      | 09/25/2001  | -            | ND              | -            | ND              | -            | ND              |
| W-7      | 05/10/2002  | -            | ND              | -            | 0.28            | -            | ND              |
| W-7      | 09/26/2002  | -            | 0.0021          | -            | 0.10            | -            | 0.0034          |
| W-7      | 05/23/2003  | -            | 0.0010          | -            | ND              | -            | 0.0034          |
| W-7      | 09/18/2003  | -            | ND              | -            | ND              | -            | 0.0039          |

**Table 5**

**Groundwater Depths at Walker Mine Tailings  
1993 - 2003**

| Depth to Groundwater<br>From Top of Casing | Monitoring Well Number: Depth to Water (ft) |            |            |            |            |            | <u>Average Depth (ft)</u> |
|--------------------------------------------|---------------------------------------------|------------|------------|------------|------------|------------|---------------------------|
|                                            | <u>W-1</u>                                  | <u>W-2</u> | <u>W-3</u> | <u>W-4</u> | <u>W-5</u> | <u>W-6</u> |                           |
| Top of Casing Elevation                    | 5729.24                                     | 5741.74    | 5738.83    | 5768.00    | 5754.09    | 5747.87    | 5754.91                   |
| 07-17-1993                                 | 13.34                                       | 2.14       | 5.12       | 16.96      | 7.90       | 5.64       | 1.06                      |
| 07-18-1994                                 | 15.06                                       | 3.00       | 6.11       | 23.43      | 11.94      | 6.74       | 7.45                      |
| 08-24-1994                                 | 15.35                                       | 3.26       | 6.59       | 24.52      | 12.88      | 7.63       | 9.71                      |
| 09-22-1994                                 | 15.49                                       | 2.94       | 6.62       | 25.25      | 13.46      | 8.14       | 10.33                     |
| 10-25-1994                                 | 15.59                                       | 2.60       | 6.28       | 25.90      | 13.97      | 8.33       | 10.56                     |
| 06-24-1995                                 | 11.17                                       | 0.86       | 3.76       | 11.61      | 4.43       | 3.33       | 1.91                      |
| 11-13-1995                                 | 14.75                                       | 2.34       | 5.98       | 22.64      | 11.32      | 7.09       | 5.04                      |
| 05-24-2000                                 | 12.54                                       | 0.95       | 4.22       | 16.58      | 6.62       | 3.73       | 9.31                      |
| 09-13-2000                                 | 14.80                                       | 2.77       | 6.08       | 22.76      | 11.34      | 7.09       | 6.42                      |
| 05-22-2001                                 | 14.06                                       | 1.61       | 4.89       | 21.88      | 10.26      | 5.05       | 9.30                      |
| 09-25-2001                                 | 15.27                                       | 3.16       | 6.69       | 25.21      | 13.39      | 8.25       | 8.33                      |
| 05-10-2002                                 | 13.18                                       | 0.94       | 4.02       | 19.56      | 8.35       | 3.73       | 10.52                     |
| 09-26-2002                                 | 14.96                                       | 2.92       | 6.40       | 24.37      | 12.59      | 7.87       | 7.19                      |
| 05-23-2003                                 | 12.45                                       | 0.68       | 3.86       | 16.86      | 6.39       | 3.75       | 10.08                     |
| 09-18-2003                                 | 14.54                                       | 2.58       | 6.08       | 22.84      | 11.35      | 7.16       | 6.28                      |
| Average Depth                              | 14.17                                       | 2.18       | 5.51       | 21.36      | 10.41      | 6.24       | 9.33                      |
| n                                          | 15                                          | 15         | 15         | 15         | 15         | 15         | 15                        |
| s                                          | 1.33                                        | 0.93       | 1.09       | 4.15       | 2.97       | 1.86       | 1.81                      |
| max                                        | 15.59                                       | 3.26       | 6.69       | 25.90      | 13.97      | 8.33       | 10.65                     |
| min                                        | 11.17                                       | 0.68       | 3.76       | 11.61      | 4.43       | 3.33       | 5.04                      |

## MONITORING REPORT

**WDR Order Number:** 5-00-028

**Discharger:** USDA Forest Service, Plumas National Forest

**Facility:** Walker Mine Tailings, Plumas County

**Reporting Frequency:** Quarterly

**Monitoring Period:** September 2003

### **Findings:**

(1) Surface water. Samples were collected September 18, 2003. The surface water sample collected at the compliance station, R-5, Little Grizzly Creek near Brown's Cabin, remains in noncompliance with the Order's limitation for copper, as highlighted in Table 1. The remaining R-5 concentrations are in compliance with the Order. Copper concentrations at R-1 slightly exceeded the limitation, while the release of copper from the tailings area to Dolly Creek, as measured at R-2, is well in excess of the limitation. Concentrations of zinc were detected in the samples taken at 2 of the 5 sites but neither of these concentrations exceeded the order's limitation for zinc. The concentration of iron, highest at R-2, does not exceed the limitation at any of the stations.

(2) Groundwater. Table 2 summarizes the findings for groundwater samples collected from the site. Small concentrations of dissolved copper ( $\leq 2.8 \text{ ug/L}$ ) were found in two of the three prescribed sampling wells (W-3 and W-5). Concentrations of dissolved iron were not detected in any of the three wells. Small concentrations of dissolved zinc were found in W-5 and W-7.

Groundwater elevations were measured in all seven wells installed at the site. The results show a definite water table gradient towards Little Grizzly Creek of approximately 0.9% along the Dolly Creek channel and approximately 1.1% to the settling pond (R-6). With the elevation of the Little Grizzly Creek channel approximately 20 feet below the surface of the tailings area, there is a strong gradient towards Little Grizzly Creek all along its course with the tailings area. Evidence of this flow is the almost continuous line of seeps along the base of the tailings area and the channel bank.

(3) Pebble Count. The two established pebble count transects were monitored, one approximately 600 feet downstream from R-6 (Little Grizzly Creek above the confluence

with Dolly Creek) and one at R-5 (Little Grizzly Creek below the confluence with Dolly Creek). Each pebble count consisted of randomly choosing particles along a transect that ran from bankfull elevation on one side of the channel to bankfull elevation on the other side of the channel within a depositional feature (riffle) of the stream.

Only the substrate surface layer is analyzed by the pebble count method. The purpose of this analysis is to investigate whether tailings material is washing over the tailings dam and into Little Grizzly Creek. Prior to 1997, the R-5 channel section contained obvious evidence of tailings material. The 1997 flood event deposited material along the R-5 channel section causing it to narrow and deepen, effectively increasing its ability to transport sediment. Most of the tailings material that once deposited along this section of the creek now washes downstream. No downstream sections have been found where the deposition of tailings material is readily evident.

To a much lesser degree than before 1997, some deposition of tailings material still occurs along the R-5 section due to its low gradient. For this reason, the pebble count data may not be as sensitive to changes in sediment delivered from the tailings as desired. A second confounding problem is the nature of the Little Grizzly Creek substrate material and its origin. Upstream of the Dolly Creek confluence, much of the material is derived from volcanic mudflow material, contains few large granitic boulders, and is controlled by cobble-gravel riffle features. The dike that separates the tailings area from Little Grizzly Creek has pushed the creek up against this mudflow feature. The mudflow feature apparently overrides the granite at this location. So there's a combination of granitic and mudflow rock types along this section. The downstream section at R-5 is predominantly granitic and is controlled by large boulders but receives cobbles and gravels from the upstream, mudflow-dominated section.

Data collected at the R-6 transect (see Table 3 and the attached field forms) indicates a distinct separation between the coarse gravel class and the silt/clay class; very little sand-sized and fine gravel materials were measured. Data from the R-5 transect location indicates a similar separation of particle sizes but at this transect the gap in size class occurs for gravel particles. While almost very few gravels were found at R-5, a significant percentage of the substrate at that location consisted of the sand-sized particles that were not present at the R-6 transect. Additionally, it was noted that the sand and silt substrate material embedded the cobbles and gravels at R-5 whereas the R-6 channel substrate material was found to be loose and not embedded.

A grain size distribution analysis on the tailings material presented in Dames and Moore's 1991 "Walker Mine Tailings Rehabilitation Study" characterized the material as poorly graded sands with some inorganic silts; the predominant particle class in the tailings was found to be fine to medium sand less than 0.425 mm in diameter. While such fine material made up only 6% of the substrate measured at R-6, 20% of the substrate particles measured at R-5 fell within the tailings material size classification. Some coarse sands do exist on the tailings and these could be the source of those found at the R-5 transect, but coarse sands are also associated with the granitic rock making up much of the substrate in this channel section.

In summary, the R-5 transect did contain sand-sized material, including the medium, fine and very fine sands found over most of the tailings area, whereas the R-6 transect does not. Based on the data collected and visible evidence made at the time the transects were established, most of the sands are being washed downstream during winter and spring flows, but material from the tailings area apparently continues to wash into Little Grizzly Creek for an extended period of time where some of it is trapped around the coarser material of the R-5 channel section.

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### **Table 1. SURFACE WATER SUMMARY**

Map of the tailings area with the surface water monitoring sites

Discharge Measurement Notes

Chain-Of-Custody record for surface water samples

Henrici Water Laboratory Analysis Reports for surface water tests

### **Table 2. GROUND WATER SUMMARY**

Map of the tailings area with the ground water monitoring sites

Map of tailings area with ground water elevations and flow direction

Water Level Data

Groundwater Monitoring, Water Sampling Field Data Sheet

Chain-Of-Custody record for ground water samples

Henrici Water Laboratory Analysis Reports for ground water tests

### **Table 3. PEBBLE COUNT (Sediment Monitoring)**

Pebble Count Field Form for Station R-6

Pebble Count Field Form for Station R-5

**SEPTEMBER 2003**

**SURFACE WATER TEST RESULTS  
AND  
SUPPORTING DOCUMENTATION**

## Table 1. SURFACE WATER SUMMARY REPORT

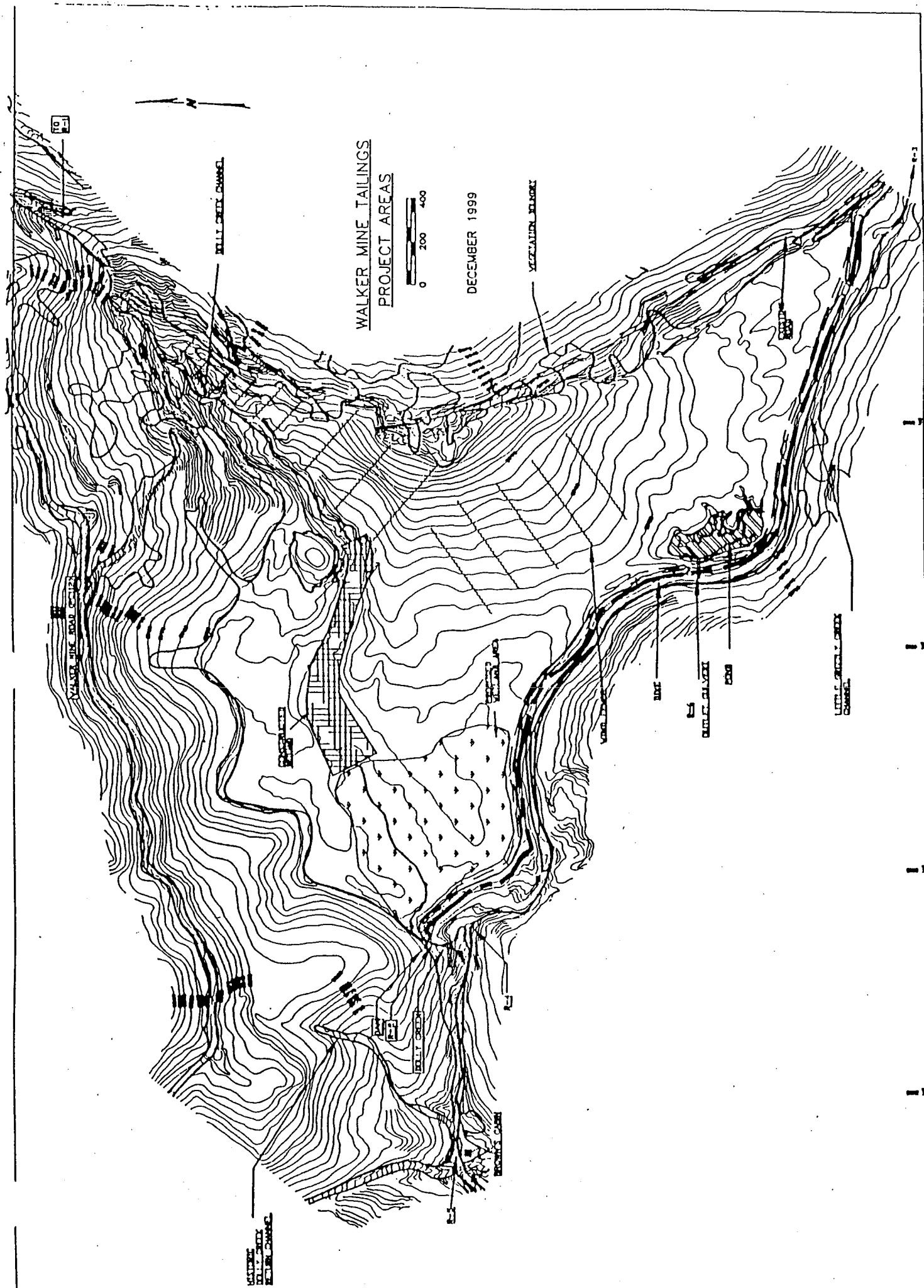
**MONITORING AND REPORTING PROGRAM No. 5-00-028**  
**U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE, PLUMAS NATIONAL FOREST**  
**WALKER MINE TAILINGS, PLUMAS COUNTY**  
**SEPTEMBER 2003**

| CONSTITUENT                         | UNITS    | DETECTION LIMITS |      |                  | MONITORING STATIONS |                  |      | R-6 | LIMITATION @ R-5 <sup>3</sup> |
|-------------------------------------|----------|------------------|------|------------------|---------------------|------------------|------|-----|-------------------------------|
|                                     |          | R-1              | R-2  | R-3 <sup>1</sup> | R-4                 | R-5 <sup>2</sup> |      |     |                               |
| Flow                                | cfs      | N/A              | 0.45 | 0.38             | 0.39                | 0.65             | 1.20 | 0   | N/A                           |
| pH                                  | number   | N/A              | 7.96 | 8.20             | 8.05                | 7.85             | 8.17 | N/A | N/A                           |
| Specific Conductance                | umhos/cm | N/A              | 102  | 122              | 98                  | 126              | 124  | N/A | N/A                           |
| Air Temperature                     | °C       | N/A              | 22.0 | 19.0             | 21.0                | 18.0             | 19.5 | N/A | N/A                           |
| Water Temperature                   | °C       | N/A              | 10.4 | 16.0             | 14.1                | 9.8              | 12.0 | N/A | N/A                           |
| Laboratory                          |          |                  |      |                  |                     |                  |      |     |                               |
| Turbidity                           | NTU      | 0.05             | 3.1  | 2.9              | 2.7                 | 1.4              | 1.9  | N/A | 3.7                           |
| Total Hardness as CaCO <sub>3</sub> | mg/l     | 2                | 71   | 72               | 57                  | 81               | 76   | N/A | N/A                           |
| Total Alkalinity                    | mg/l     | 1                | 77   | 79               | 80                  | 83               | 84   | N/A | N/A                           |
| Sulfate                             | mg/l     | 0.5              | 2.9  | 3.1              | 2.9                 | 19.4             | 17.4 | N/A | N/A                           |
| Dissolved Copper                    | ug/l     | 1.0              | 11   | 100              | 3.2                 | 1.0              | 30   | N/A | 7.1                           |
| Dissolved Iron                      | ug/l     | 50               | 270  | 470              | 160                 | 200              | 400  | N/A | 1000                          |
| Dissolved Zinc                      | ug/l     | 2.0              | ND   | 8.0              | ND                  | ND               | 2.2  | N/A | g4                            |

<sup>1</sup> R-3 is the background station located above the tailings area on Little Grizzly Creek.

<sup>2</sup> R-5 is the waste discharge compliance station located near Brown's Cabin, downstream from the confluence of Dolly Creek with Little Grizzly Creek.

<sup>3</sup> The compliance values for copper and zinc are calculated with the R-5 hardness value of 76 mg/l as CaCO<sub>3</sub>.



WALKER MINE TAILINGS MONITORING PROGRAM

9-278-1  
(May 1971)

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY  
WATER RESOURCES DIVISION

DISCHARGE MEASUREMENT NOTES

Site No. R-1

Date 9/18/2003  
Dolly Creek above Tailings @ Road 112

Method G/H No. sec. C. H. change in hrs. Sup.

Method coef. Hor. angle coef. Susp. coeff. Meter No.

GAGE READINGS  
Recorder Inside Outside  
Time Date rated for rod, other.  
Meter It. above bottom of weight.

Spin before meas. after  
Meas. plots % diff. from rating

Wading, table, ice, boat, upstr., downstr., side  
bridge feet, mile, above, below  
gage, and  
Check-bar, found

changed to at  
Correct  
Levels obtained

Weighed M. C. H.  
C. H. correction  
Correct M. C. H.

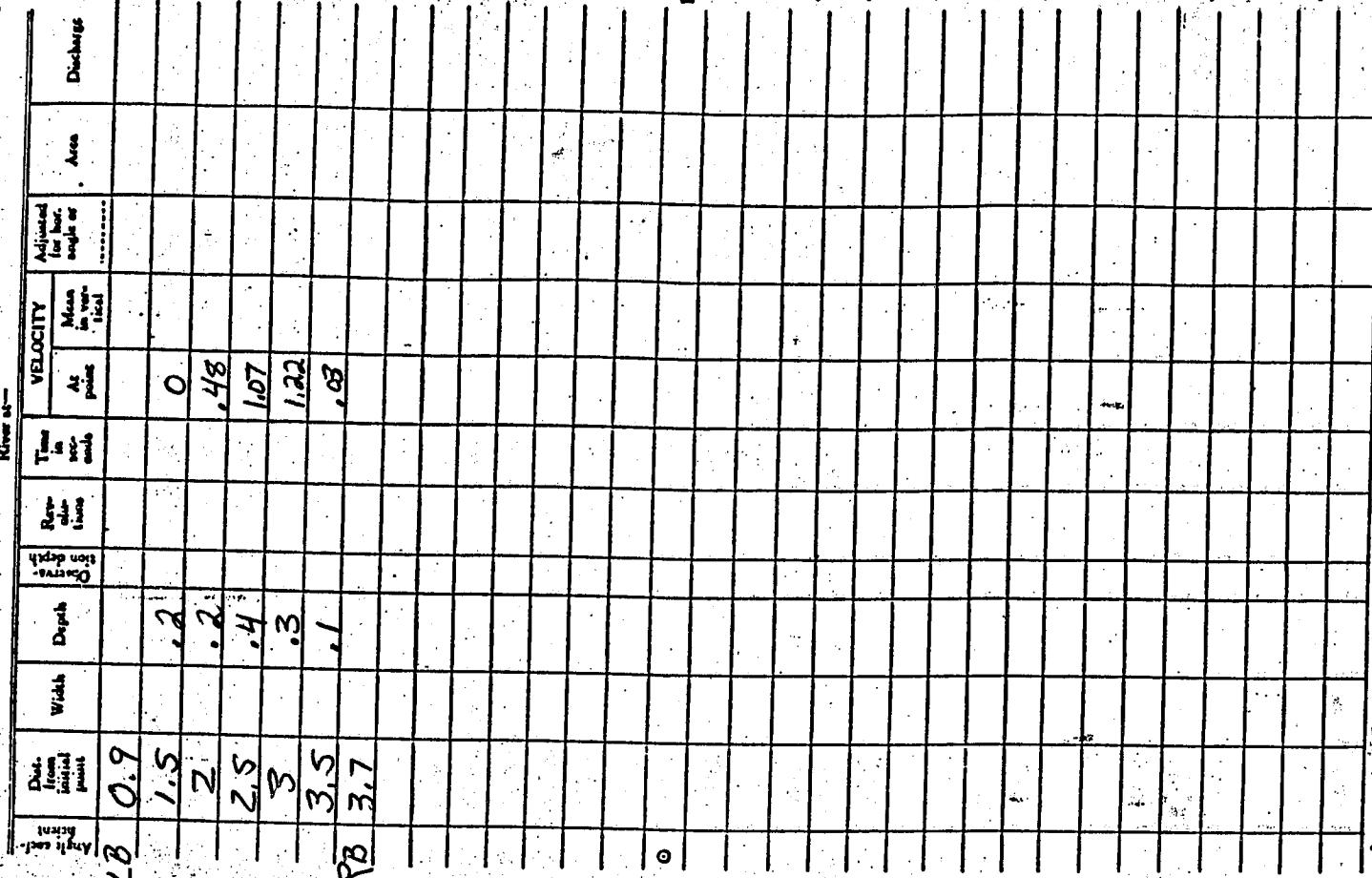
Measurement rated excellent (2% good (5%), (3) (8%) poor (over 8%), based on following  
condition: Cross section

Flow Weather Waterman Check  
Other Air 22.0 °C @ 1454  
Gage Water 10.4 °C @ 1456

Record removed Intake flushed  
Observer  
Control

pH 7.96  
CONDUCTANCE 102 umhos/cm  
C. H. of zero flow

Samples e 1450





**WALKER MINE TAILINGS MONITORING PROGRAM**

9-27547  
(May 1971)

UNITED STATES  
DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

**DISCHARGE MEASUREMENT NOTES**

Checked by \_\_\_\_\_

Date \_\_\_\_\_

Station No. R-3

Location Little Grizzly Creek above Tailings

Date 9/18/74

Party 2003 Party Check/Metric

Method GHD

No. sec. 0

C. H. change 0

G. H. in 0

hr. Susp. 0

Hor. angle coef. 0

Susp. coef. 0

Meter No. 0

Type of meter MM

Date rated 0

for rod, other 0

Meter 0

ft. above bottom of weight 0

Spin before meas. 0

% diff. from rating 0

Meas. plts 0

Wading, able, ice, boat, upstr., downstr., side 0

bridge 0

feet, mile, above, below 0

gage, and 0

Check-bar, found 0

changed to 0

at 0

Correct 0

Levels obtained 0

Cross section 0

Measurement rated excellent (2%), good (3%), fair (8%), poor (over 8%) based on following

conditions: Cross section 0

Flow 0

Weather Warm / Clear

Air 21.0 °C @ 1422

Water 14.1 °C @ 1424

Intake flushed 0

Record removed 0

Observer 0

Control 0

pH 8.05

CONDUCTANCE 98 umhos/cm

C. H. of zero flow 0

Sample # 1420

River 0 ft.

9-27547

(May 1971)

UNITED STATES

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

DISCHARGE MEASUREMENT NOTES

Checked by \_\_\_\_\_

Date \_\_\_\_\_

Station No. R-3

Location Little Grizzly Creek above Tailings

Date 9/18/74

Party 2003 Party Check/Metric

Method GHD

No. sec. 0

C. H. change 0

G. H. in 0

hr. Susp. 0

Hor. angle coef. 0

Susp. coef. 0

Meter No. 0

Type of meter MM

Date rated 0

for rod, other 0

Meter 0

ft. above bottom of weight 0

Spin before meas. 0

% diff. from rating 0

Meas. plts 0

Wading, able, ice, boat, upstr., downstr., side 0

bridge 0

feet, mile, above, below 0

gage, and 0

Check-bar, found 0

changed to 0

at 0

Correct 0

Levels obtained 0

Cross section 0

Measurement rated excellent (2%), good (3%), fair (8%), poor (over 8%) based on following

conditions: Cross section 0

Flow 0

Weather Warm / Clear

Air 21.0 °C @ 1422

Water 14.1 °C @ 1424

Intake flushed 0

Record removed 0

Observer 0

Control 0

pH 8.05

CONDUCTANCE 98 umhos/cm

C. H. of zero flow 0

Sample # 1420

River 0 ft.

WALKER MINE TAILINGS MONITORING PROGRAM

8-2756  
(May 1971)

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

DISCHARGE MEASUREMENT NOTES

Sta. No. R-4

Little Grizzly Creek below Tailings

Date 2003 Party Lynx/Retina

Area Vel. C.H. Ditch

Method 610 No. sec. C.H. change in hrs. Sup.

Method coef. Hor. angle coef. Sup. coef. Motor No.

Type of meter DNH

Date rated for rod, other

Meter ft. above bottom of weight

Spin before meas. after

Meas. plots % diff. from rating

~~Trading~~ table, ice, boat, upstream, downstream, side

bridge feet, mile, above, below

gage, and

Check-bar, found

changed to at

Correct

Levels obtained

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following

conditions: Cross section

Flow Weather Light rain / Clear

Other Air  $18.0^{\circ}\text{C}$  @ 1354

Cage Water  $2.8^{\circ}\text{C}$  @ 1352

Record removed Intake flushed U

Observer

Control

PH 7.85

CONDUCTANCE 126 umhos/cm

C.H. of zero flow ft.

River no. 1352

Adjusted for base, height or

area Discharge

0.00

0.02

0.08

0.08

0.08

0.14

0.15

0.21

0.26

0.27

0.20

0.15

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# Henrici Water Laboratory Chain of Custody Wolker Mine Tailings (Surface Water)

Purveyor: USFS Pinhook National Forest

159 Lawrence St.

955971

Joe Hoffmann 53  
Pitt St

Samplers Signature

**HENRICI WATER LABORATORY**  
1832 BUTTERFLY VALLEY ROAD, QUINCY, CALIFORNIA 95971  
PHONE (530) 281-6588

Plumas National Forest  
Supervisor's Office  
P.O. Box 11500  
Quincy, CA 95971

Account: 11616  
Date: 12/01/03  
Page: 1

ANALYSIS REPORT

Laboratory Number: C35348 Date Received: 09/18/03  
Location: Walker Mine R-1  
Date of Collection : 09/18/03 Time: 1450 Collector: Flynn

Hardness, Dissolved Copper Iron and Zinc analysis by Twining Laboratory,  
Bakersfield, CA.

| Analysis         | Date of Analysis | Method    | Detection Limits | Results | Units |
|------------------|------------------|-----------|------------------|---------|-------|
| Total Hardness   | 11/20/03         | EPA 200.7 | 2                | 71      | mg/L  |
| Total Alkalinity | 09/19/03         | SM 2320 B | 1                | 77      | mg/L  |
| Sulfate          | 09/30/03         | SM 375.4  | 0.5              | 2.9     | mg/L  |
| Turbidity        | 09/19/03         | SM 2130B  | 0.05             | 3.1     | NTU   |
| Dissolved Iron   | 11/21/03         | EPA 200.7 | 50               | 270     | ug/L  |
| Dissolved Copper | 11/21/03         | EPA 200.7 | 1.0              | 11      | ug/L  |
| Dissolved Zinc   | 11/21/03         | EPA 200.7 | 2.0              | <2.0    | ug/L  |

These results were obtained by following  
standard laboratory procedures: the liability  
of the laboratory shall not exceed the

Dawn M. Henton

**HENRICI WATER LABORATORY**  
1832 BUTTERFLY VALLEY ROAD, QUINCY, CALIFORNIA 95971  
PHONE (530) 281-6588

Plumas National Forest  
Supervisor's Office  
P.O. Box 11500  
Quincy, CA 95971

Account: 11616  
Date: 12/01/03  
Page: 1

**ANALYSIS REPORT**

Laboratory Number: C35349 Date Received: 09/18/03  
Location: Walker Mine R-2  
Date of Collection : 09/18/03 Time: 1325 Collector: Flynn

Hardness, Dissolved Copper Iron and Zinc analysis by Twining Laboratory,  
Bakersfield, CA.

| Analysis         | Date of Analysis | Method    | Detection Limits | Results | Units |
|------------------|------------------|-----------|------------------|---------|-------|
| Total Hardness   | 11/20/03         | EPA 200.7 | 2                | 72      | mg/L  |
| Total Alkalinity | 09/19/03         | SM 2320 B | 1                | 79      | mg/L  |
| Sulfate          | 09/30/03         | SM 375.4  | 0.5              | 3.1     | mg/L  |
| Turbidity        | 09/19/03         | SM 2130B  | 0.05             | 2.9     | NTU   |
| Dissolved Iron   | 11/21/03         | EPA 200.7 | 50               | 470     | ug/L  |
| Dissolved Copper | 11/21/03         | EPA 200.7 | 1.0              | 100     | ug/L  |
| Dissolved Zinc   | 11/21/03         | EPA 200.7 | 2.0              | 8.0     | ug/L  |

These results were obtained by following  
standard laboratory procedures: the liability  
of the laboratory shall not exceed the

Dawn M. Henton  
*DMH*

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Quincy, CA 95971

Account: 11616  
Date: 12/01/03  
Page: 1

ANALYSIS REPORT

Laboratory Number: C35350 Date Received: 09/18/03  
Location: Walker Mine R-3  
Date of Collection : 09/18/03 Time: 1420 Collector: Flynn

Hardness, Dissolved Copper Iron and Zinc analysis by Twining Laboratory,  
Bakersfield, CA.

| Analysis         | Date of Analysis | Method    | Detection Limits | Results | Units |
|------------------|------------------|-----------|------------------|---------|-------|
| Total Hardness   | 11/20/03         | EPA 200.7 | 2                | 57      | mg/L  |
| Total Alkalinity | 09/19/03         | SM 2320 B | 1                | 80      | mg/L  |
| Sulfate          | 09/30/03         | SM 375.4  | 0.5              | 2.9     | mg/L  |
| Turbidity        | 09/19/03         | SM 2130B  | 0.05             | 2.7     | NTU   |
| Dissolved Iron   | 11/21/03         | EPA 200.7 | 50               | 160     | ug/L  |
| Dissolved Copper | 11/21/03         | EPA 200.7 | 1.0              | 3.2     | ug/L  |
| Dissolved Zinc   | 11/21/03         | EPA 200.7 | 2.0              | <2.0    | ug/L  |

These results were obtained by following  
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of the laboratory shall not exceed the

*Dawn M. Henton*  
Dawn M. Henton

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Account: 11616  
Date: 12/01/03  
Page: 1

ANALYSIS REPORT

Laboratory Number: C35351 Date Received: 09/18/03  
Location: Walker Mine R-4  
Date of Collection : 09/18/03 Time: 1352 Collector: Flynn

Hardness, Dissolved Copper Iron and Zinc analysis by Twining Laboratory,  
Bakersfield, CA.

| Analysis         | Date of Analysis | Method    | Detection Limits | Results | Units |
|------------------|------------------|-----------|------------------|---------|-------|
| Total Hardness   | 11/20/03         | EPA 200.7 | 2                | 81      | mg/L  |
| Total Alkalinity | 09/19/03         | SM 2320 B | 1                | 83      | mg/L  |
| Sulfate          | 09/30/03         | SM 375.4  | 0.5              | 19.4    | mg/L  |
| Turbidity        | 09/19/03         | SM 2130B  | 0.05             | 1.4     | NTU   |
| Dissolved Iron   | 11/21/03         | EPA 200.7 | 50               | 200     | ug/L  |
| Dissolved Copper | 11/21/03         | EPA 200.7 | 1.0              | 1.0     | ug/L  |
| Dissolved Zinc   | 11/21/03         | EPA 200.7 | 2.0              | <2.0    | ug/L  |

These results were obtained by following  
standard laboratory procedures: the liability  
of the laboratory shall not exceed the

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*Dawn M. Henton*

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Account: 11616  
Date: 12/01/03  
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ANALYSIS REPORT

Laboratory Number: C35352 Date Received: 09/18/03  
Location: Walker Mine R-5  
Date of Collection : 09/18/03 Time: 1520 Collector: Flynn

Hardness, Dissolved Copper Iron and Zinc analysis by Twining Laboratory,  
Bakersfield, CA.

| Analysis         | Date of Analysis | Method    | Detection Limits | Results | Units |
|------------------|------------------|-----------|------------------|---------|-------|
| Total Hardness   | 11/20/03         | EPA 200.7 | 2                | 76      | mg/L  |
| Total Alkalinity | 09/19/03         | SM 2320 B | 1                | 84      | mg/L  |
| Sulfate          | 09/30/03         | SM 375.4  | 0.5              | 17.4    | mg/L  |
| Turbidity        | 09/19/03         | SM 2130B  | 0.05             | 1.9     | NTU   |
| Dissolved Iron   | 11/21/03         | EPA 200.7 | 50               | 400     | ug/L  |
| Dissolved Copper | 11/21/03         | EPA 200.7 | 1.0              | 30      | ug/L  |
| Dissolved Zinc   | 11/21/03         | EPA 200.7 | 2.0              | 2.2     | ug/L  |

These results were obtained by following  
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of the laboratory shall not exceed the

*bmy*  
Dawn M. Henton

**SEPTEMBER 2003**

**GROUND WATER TEST RESULTS  
AND  
SUPPORTING DOCUMENTATION**

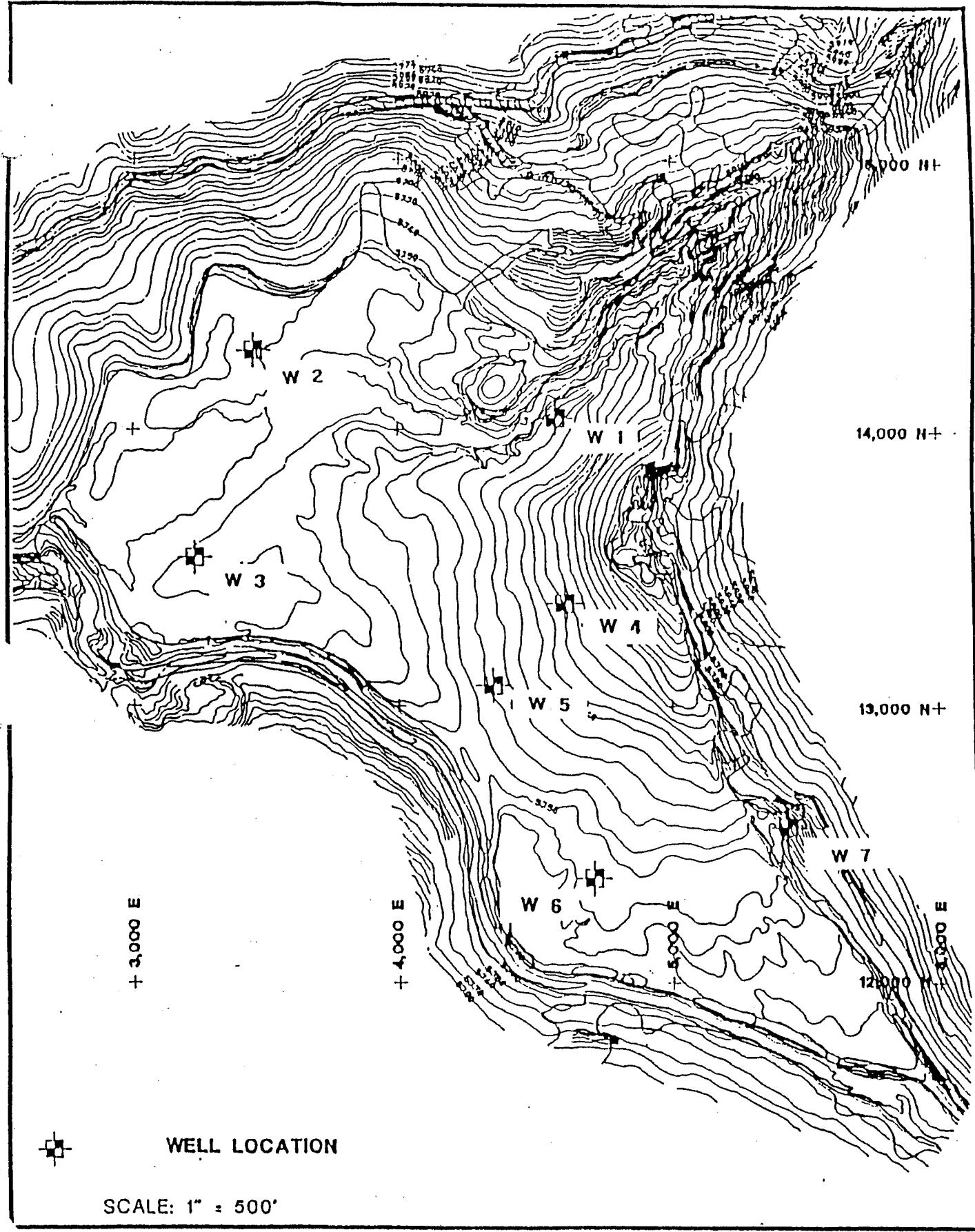
**Table 2. GROUND WATER SUMMARY**

**MONITORING AND REPORTING PROGRAM NO. 5-00-028**  
**U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE, PLUMAS NATIONAL FOREST**  
**WALKER MINE TAILINGS, PLUMAS COUNTY**  
**SEPTEMBER 2003**

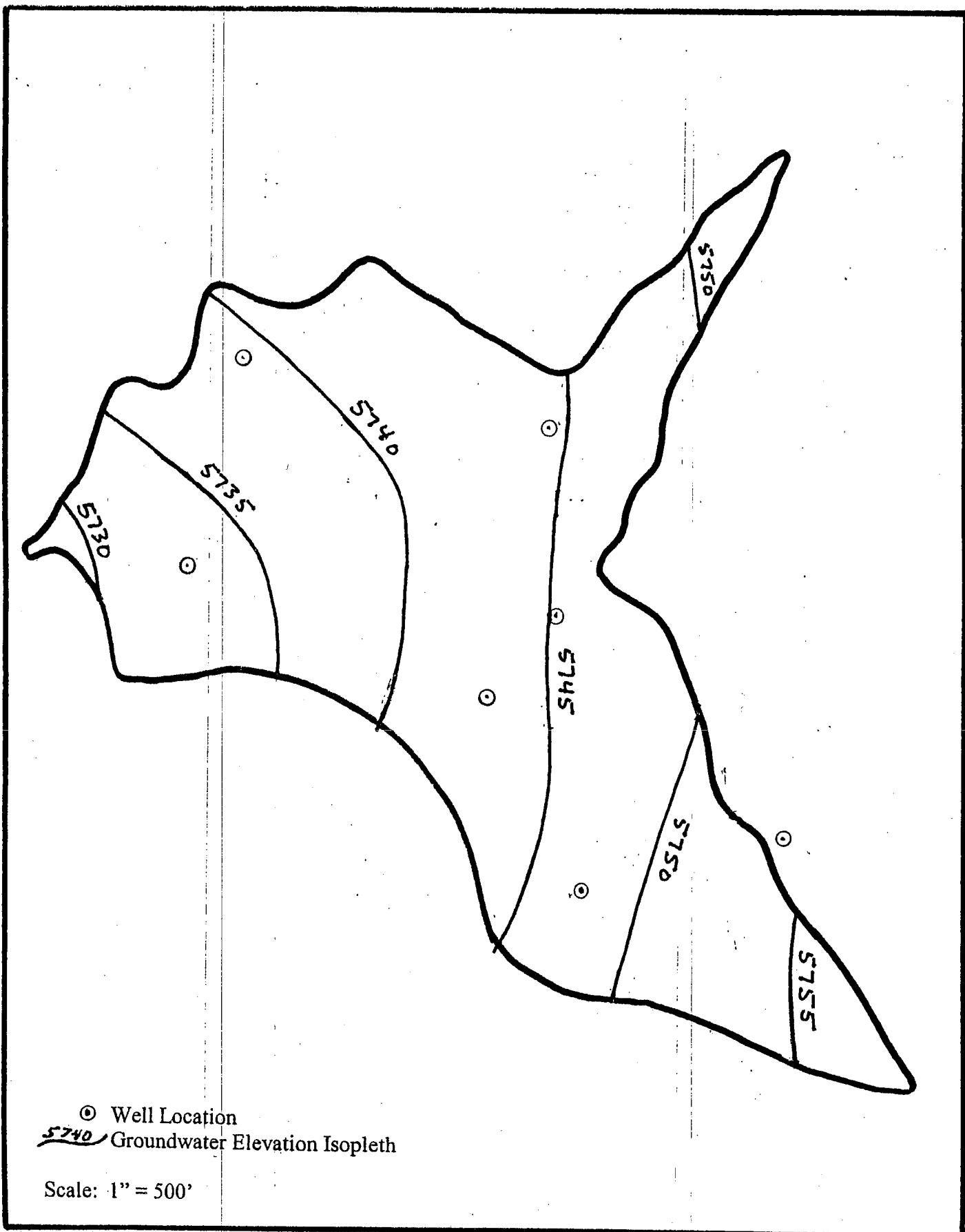
| CONSTITUENT                         | UNIT | DETECTION LIMIT | DETECTION |         |         |         | WELL SITES |         |         |     | W-6 | W-7* |
|-------------------------------------|------|-----------------|-----------|---------|---------|---------|------------|---------|---------|-----|-----|------|
|                                     |      |                 | W-1       | W-2     | W-3     | W-4     | W-5        | W-6     | W-7     | W-8 |     |      |
| Ground Surface Elevation            | ft   | 0.01            | 5759.50   | 5742.05 | 5739.15 | 5768.27 | 5754.28    | 5748.04 | 5753.85 | N/A | N/A |      |
| Top of Cap Elevation                | ft   | 0.01            | 5759.24   | 5741.74 | 5738.83 | 5768.00 | 5754.09    | 5747.87 | 5754.91 | N/A | N/A |      |
| Depth to Water                      | ft   | 0.01            | 14.54     | 2.58    | 6.08    | 22.84   | 11.35      | 7.16    | 0.79    | N/A | N/A |      |
| Water Surface Elevation             | ft   | 0.01            | 5744.70   | 5739.16 | 5732.75 | 5745.16 | 5742.74    | 5740.71 | 5754.12 | N/A | N/A |      |
| <hr/>                               |      |                 |           |         |         |         |            |         |         |     |     |      |
| Total Hardness as CaCO <sub>3</sub> | mg/l | 2               | N/A       | N/A     | 200     | N/A     | 190        | N/A     | 33      | N/A | N/A |      |
| Total Alkalinity                    | mg/l | 1               | N/A       | N/A     | 101     | N/A     | 80         | N/A     | 40      | N/A | N/A |      |
| Sulfate                             | mg/l | 0.5             | N/A       | N/A     | 133.4   | N/A     | 233.3      | N/A     | 2.8     | N/A | N/A |      |
| Dissolved Copper                    | ug/l | 1.0             | N/A       | N/A     | 2.5     | N/A     | 2.8        | N/A     | ND      | N/A | N/A |      |
| Dissolved Iron                      | ug/l | 50              | N/A       | N/A     | ND      | N/A     | ND         | N/A     | ND      | N/A | N/A |      |
| Dissolved Zinc                      | ug/l | 2.0             | N/A       | N/A     | ND      | N/A     | 5.60       | N/A     | 3.9     | N/A | N/A |      |

\*W-7 is located upgradient and off-site in a wet area. The data collected from this well are used for background comparisons.

7502 1 2/93 .11



WALKER MINE TAILINGS



WALKER MINE TAILINGS  
GROUNDWATER CONTOUR MAP

September 2003

## WALKER MINE GROUNDWATER MONITORING PROGRAM FLUID LEVEL GAUGING

SITE LOCATION: Walker Mine  
COMPANY NAME: USFS  
PERSONNEL: P Flynn / Martin

DATE: 9/18/03

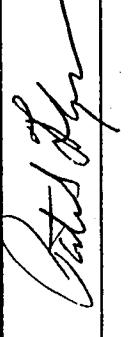






Henrici Water Laboratory Chain of Custody Weller Tailings (Ground Water) Proj # 5-00-028

Purveyor: USFS Piñon National Forest  
159 Lawrence St  
Quincy, CA 95971  
Attn Joe Hoffman (530) 283-2050

| Purveyor: USFS Plumes National Forest                                                                       |         |       |               | Type of Analyses |                            |
|-------------------------------------------------------------------------------------------------------------|---------|-------|---------------|------------------|----------------------------|
| 159 Lawrence St<br>Quincy, MA 95971<br>Attn: Joe Hoffman (530) 283-2050                                     |         |       |               | Remarks          |                            |
| Sampler's Signature:<br> |         |       |               |                  |                            |
| ID. No.                                                                                                     | Date    | Time  | Location      | No. of Samples   | Comments                   |
| 9/18/03                                                                                                     | 1105    | W - 3 |               | 1                | X X X X X Detection limits |
| 9/18/03                                                                                                     | 1205    | W - 5 |               | 1                | X X X X Cu: 1 ug/L         |
| 9/18/03                                                                                                     | 1305    | W - 7 |               | 1                | X X X X Zn: 2 ug/L         |
|                                                                                                             |         |       |               |                  | Fe: 50 ug/L                |
| All limits as $\mu\text{g}/\text{L}$                                                                        |         |       |               |                  |                            |
| Hazardous as $\text{CC}_3$                                                                                  |         |       |               |                  |                            |
| Sulfate as $\text{CC}_3$                                                                                    |         |       |               |                  |                            |
| Copper as $\text{CC}_3$                                                                                     |         |       |               |                  |                            |
| Iron (1) as $\text{CC}_3$                                                                                   |         |       |               |                  |                            |
| Zinc (1) as $\text{CC}_3$                                                                                   |         |       |               |                  |                            |
| Tin (1) as $\text{CC}_3$                                                                                    |         |       |               |                  |                            |
| Lead (1) as $\text{CC}_3$                                                                                   |         |       |               |                  |                            |
| Walker Tailings<br>Ground water<br>Project # 5-00-028                                                       |         |       |               |                  |                            |
| Relinquished By                                                                                             | Date    | Time  | Received By   |                  |                            |
|                        | 9/18/03 | 1615  | Dawn M Norton |                  |                            |

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Account: 11616  
Date: 12/01/03  
Page: 1

ANALYSIS REPORT

Laboratory Number: C35353 Date Received: 09/18/03  
Location: Walker Mine W-3  
Date of Collection : 09/18/03 Time: 1105 Collector: Flynn

Hardness, Dissolved Copper Iron and Zinc analysis by Twining Laboratory,  
Bakersfield, CA.

| Analysis         | Date of Analysis | Method    | Detection Limits | Results | Units |
|------------------|------------------|-----------|------------------|---------|-------|
| Total Hardness   | 11/20/03         | EPA 200.7 | 2                | 200     | mg/L  |
| Total Alkalinity | 09/19/03         | SM 2320 B | 1                | 101     | mg/L  |
| Sulfate          | 09/30/03         | SM 375.4  | 0.5              | 133.4   | mg/L  |
| Dissolved Iron   | 11/21/03         | EPA 200.7 | 50               | <50     | ug/L  |
| Dissolved Copper | 11/21/03         | EPA 200.7 | 1.0              | 2.5     | ug/L  |
| Dissolved Zinc   | 11/21/03         | EPA 200.7 | 2.0              | <2.0    | ug/L  |

These results were obtained by following  
standard laboratory procedures: the liability  
of the laboratory shall not exceed the

*Omg*  
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Account: 11616  
Date: 12/01/03  
Page: 1

ANALYSIS REPORT

Laboratory Number: C35354 Date Received: 09/18/03  
Location: Walker Mine W-5  
Date of Collection : 09/18/03 Time: 1205 Collector: Flynn

Hardness, Dissolved Copper Iron and Zinc analysis by Twining Laboratory,  
Bakersfield, CA.

| Analysis         | Date of Analysis | Method    | Detection Limits | Results | Units |
|------------------|------------------|-----------|------------------|---------|-------|
| Total Hardness   | 11/20/03         | EPA 200.7 | 2                | 190     | mg/L  |
| Total Alkalinity | 09/19/03         | SM 2320 B | 1                | 80      | mg/L  |
| Sulfate          | 09/30/03         | SM 375.4  | 0.5              | 233.3   | mg/L  |
| Dissolved Iron   | 11/21/03         | EPA 200.7 | 50               | <50     | ug/L  |
| Dissolved Copper | 11/21/03         | EPA 200.7 | 1.0              | 2.8     | ug/L  |
| Dissolved Zinc   | 11/21/03         | EPA 200.7 | 2.0              | 5.6     | ug/L  |

These results were obtained by following  
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Dawn M. Henton

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Account: 11616  
Date: 12/01/03  
Page: 1

ANALYSIS REPORT

Laboratory Number: C35355 Date Received: 09/18/03  
Location: Walker Mine W-7  
Date of Collection : 09/18/03 Time: 1305 Collector: Flynn

Hardness, Dissolved Copper Iron and Zinc analysis by Twining Laboratory,  
Bakersfield, CA.

| Analysis         | Date of Analysis | Method    | Detection Limits | Results | Units |
|------------------|------------------|-----------|------------------|---------|-------|
| Total Hardness   | 11/20/03         | EPA 200.7 | 2                | 33      | mg/L  |
| Total Alkalinity | 09/19/03         | SM 2320 B | 1                | 40      | mg/L  |
| Sulfate          | 09/30/03         | SM 375.4  | 0.5              | 2.8     | mg/L  |
| Dissolved Iron   | 11/21/03         | EPA 200.7 | 50               | <50     | ug/L  |
| Dissolved Copper | 11/21/03         | EPA 200.7 | 1.0              | <1.0    | ug/L  |
| Dissolved Zinc   | 11/21/03         | EPA 200.7 | 2.0              | 3.9     | ug/L  |

These results were obtained by following  
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**2003**

**PEBBLE COUNT  
(SEDIMENT MONITORING)  
AND  
SUPPORTING DOCUMENTATION**

**Table 3. PEBBLE COUNT (Sediment Monitoring)**

|                                                                               |  |
|-------------------------------------------------------------------------------|--|
| <b>MONITORING AND REPORTING PROGRAM NO. 5-00-028</b>                          |  |
| <b>U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE, PLUMAS NATIONAL FOREST</b> |  |
| <b>WALKER MINE TAILINGS, PLUMAS COUNTY</b>                                    |  |
| <b>SEPTEMBER 2003</b>                                                         |  |

| Particle Size Distribution<br>(% smaller than) | R-6* | Particle Size (mm) | Particle Size Descriptor | Particle Size (mm) | R-5** | Particle Size Descriptor |
|------------------------------------------------|------|--------------------|--------------------------|--------------------|-------|--------------------------|
| D95***                                         | 224  |                    | large boulder            | 750                |       | medium boulder           |
| D84                                            | 130  |                    | large cobble             | 280                |       | small boulder            |
| D50                                            | 60   |                    | very coarse gravel       | 65                 |       | small cobble             |
| D35                                            | 42   |                    | very coarse gravel       | 24                 |       | coarse gravel            |
| D16                                            | 20   |                    | coarse gravel            | 0.26               |       | medium sand              |
| D5                                             | 0.1  |                    | very fine sand           | 0.03               |       | silt/clay                |

\* Transect located 600 feet downstream from R-6. The channel substrate is directly affected by a volcanic mudflow lithic layer.  
Particles < 2 mm in diameter (sand size and smaller) made up 7% of the transect sampled, 3% in the silt/clay class.

\*\* Transect located at R-5. The channel substrate is affected by granitic and metavolcanic rock types, plus material from the tailings pond. No bedrock exposure, but large granitic boulders present. Substrate in the active channel is embedded (held firmly in place by much smaller particles). Particles < 2 mm in diameter made up 29% of the transect sampled, mostly in the sand size class.

\*\*\* D95 = the particle size diameter that is larger than 95% of all other particles in the sample.

# WALKER MINE TAILINGS MONITORING PROGRAM

## PEBBLE COUNT

R-6

Station: Little Grizzly Cr., upstream of Dolly Cr.

Date: 10/2/03

Condition: Cloudy

confluence

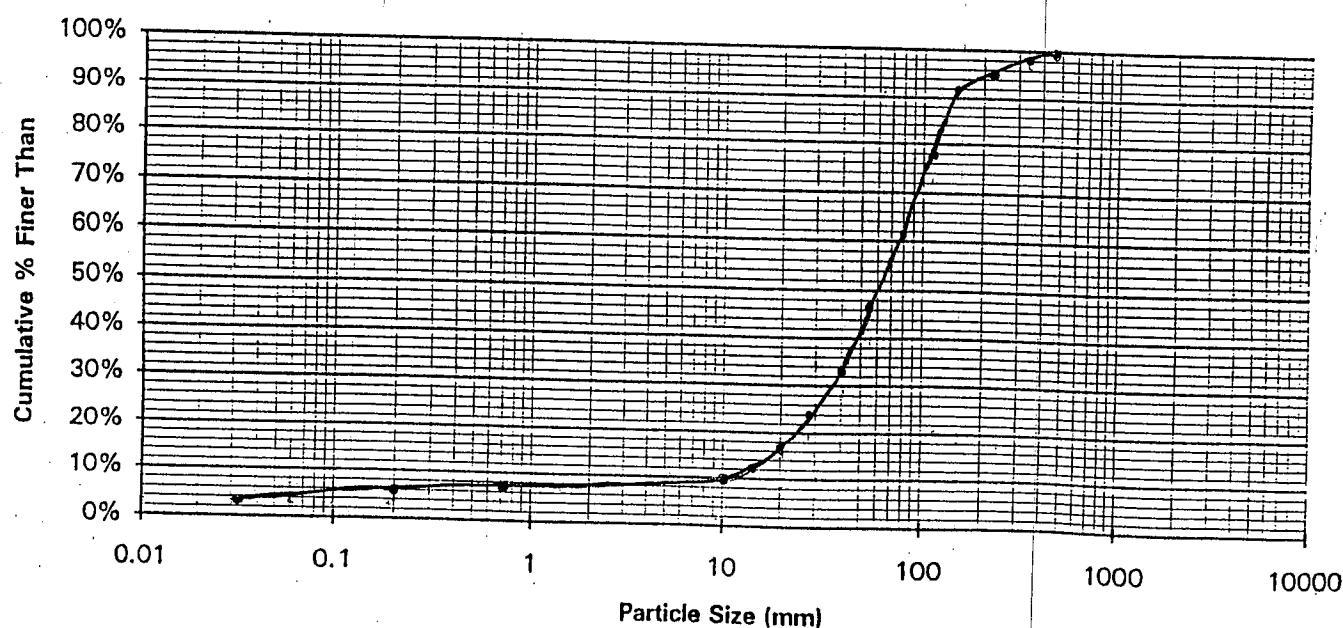
Party: Hoffman - recording  
Cartwright - Sampling

| Pebble Count |                |             |                |       |       |       |  |  |                      |                      |
|--------------|----------------|-------------|----------------|-------|-------|-------|--|--|----------------------|----------------------|
| Inches       | Particle       | (mm)        | Item Count (#) | Tot # | % tot | % Cum |  |  | Bankfull Depths (ft) | Bankfull Widths (ft) |
|              | Silt/Clay      | < .062      | ••             | 3     | 3     | 3     |  |  |                      |                      |
|              | V. Fine Sand   | .062-.125   | ••             | 0     | 0     | 3     |  |  |                      |                      |
|              | Fine           | .125-.25    | ••             | 3     | 3     | 6     |  |  |                      |                      |
|              | Medium         | .25-.5      | •              | 0     | 0     | 6     |  |  |                      |                      |
|              | Coarse         | .5 - 1.0    | •              | 1     | 1     | 7     |  |  |                      |                      |
| .04 - .08    | V. Coarse      | 1.0 - 2.0   |                | 0     | 0     | 7     |  |  |                      |                      |
| .08 - .16    | V. fine Gravel | 2 - 4       |                | 0     | 0     | 7     |  |  |                      |                      |
| .16 - .24    | Fine           | 4 - 6       |                | 0     | 0     | 7     |  |  |                      |                      |
| .24 - .31    |                | 6 - 8       |                | 0     | 0     | 7     |  |  |                      |                      |
| .31 - .47    | Medium         | 8 - 12      | ••             | 3     | 3     | 10    |  |  |                      |                      |
| .47 - .63    |                | 12 - 16     | •              | 2     | 2     | 12    |  |  |                      |                      |
| .63 - .94    | Coarse         | 16 - 24     | ••             | 4     | 4     | 16    |  |  |                      |                      |
| .94 - 1.26   |                | 24 - 32     | •••            | 8     | 8     | 24    |  |  |                      |                      |
| 1.26 - 2.9   | V. Coarse      | 32 - 48     | •••            | 9     | 9     | 33    |  |  |                      |                      |
| 1.9 - 2.5    |                | 48 - 64     | ••••           | 14    | 14    | 47    |  |  |                      |                      |
| 2.5 - 3.8    | Small Cobble   | 64 - 96     | ••••           | 14    | 14    | 61    |  |  |                      |                      |
| 3.8 - 5.0    |                | 96 - 128    | ••••           | 17    | 17    | 78    |  |  |                      |                      |
| 5.0 - 7.6    | Large          | 128 - 192   | ••••           | 14    | 14    | 92    |  |  |                      |                      |
| 7.6 - 10     |                | 192 - 256   | ••             | 3     | 3     | 95    |  |  |                      |                      |
| 10 - 15      | Small Boulder  | 256 - 384   | ••             | 3     | 3     | 98    |  |  |                      |                      |
| 15 - 20      |                | 384 - 512   | •              | 2     | 2     | 100   |  |  |                      |                      |
| 20 - 40      | Medium         | 512 - 1024  |                |       |       |       |  |  |                      |                      |
| 40 - 80      | Large          | 1024 - 2048 |                |       |       |       |  |  |                      |                      |
| 80 - 160     | V. Large       | 2048 - 4096 |                |       |       |       |  |  |                      |                      |
|              | Bedrock        |             |                |       |       |       |  |  |                      |                      |
|              |                | TOTALS:     | 100            | 100   | 100   |       |  |  |                      |                      |

Notes:

||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| |||||  
||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| |||||

At same location (x-section) as  
2000 - 2002 (~600 ft downstream  
of R-6)



# WALKER MINE TAILINGS MONITORING PROGRAM

## PEBBLE COUNT

Station: B-5, Brown's Cabin

Date: 10-02-03

Condition: Clear, mild

Party: Hoffman - recording  
Cartwright - sampling  
(with gravimeter)

| Pebble Count |                |             |                |       |       |       |
|--------------|----------------|-------------|----------------|-------|-------|-------|
| Inches       | Particle       | (mm)        | Item Count (#) | Tot # | % tot | % Cum |
|              | Silt/Clay      | < .062      | X : :          | 8     | 8     | 8     |
|              | V. Fine Sand   | .062-.125   | n/a            | 0     | 0     | 8     |
|              | Fine           | .125-.25    | X : :          | 6     | 6     | 14    |
|              | Medium         | .25-.5      | X : :          | 6     | 6     | 20    |
| .04 - .08    | Coarse         | .5 - 1.0    | X : :          | 9     | 9     | 29    |
|              | V. Coarse      | 1.0 - 2.0   |                | 0     | 0     | 29    |
| .08 - .16    | V. fine Gravel | 2 - 4       |                | 0     | 0     | 29    |
| .16 - .24    | Fine           | 4 - 6       | *              | 1     | 1     | 30    |
| .24 - .31    |                | 6 - 8       | *              | 1     | 1     | 31    |
| .31 - .47    | Medium         | 8 - 12      |                | 0     | 0     | 31    |
| .47 - .63    |                | 12 - 16     | *              | 1     | 1     | 32    |
| .63 - .94    | Coarse         | 16 - 24     | *              | 1     | 1     | 33    |
| .94 - 1.26   |                | 24 - 32     |                | 0     | 0     | 33    |
| 1.26 - 2.9   | V. Coarse      | 32 - 48     | X : :          | 7     | 7     | 40    |
| 1.9 - 2.5    |                | 48 - 64     | X : :          | 8     | 8     | 48    |
| 2.5 - 3.8    | Small Cobble   | 64 - 96     | X : :          | 7     | 7     | 55    |
| 3.8 - 5.0    |                | 96 - 128    | X : :          | 6     | 6     | 61    |
| 5.0 - 7.6    | Large          | 128 - 192   | X : :          | 8     | 8     | 69    |
| 7.6 - 10     |                | 192 - 256   | X : :          | 9     | 9     | 78    |
| 10 - 15      | Small Boulder  | 256 - 384   | X : :          | 10    | 10    | 88    |
| 15 - 20      |                | 384 - 512   |                | 0     | 0     | 88    |
| 20 - 40      | Medium         | 512 - 1024  | X : :          | 6     | 6     | 94    |
| 40 - 80      | Large          | 1024 - 2048 | X : :          | 6     | 6     | 100   |
| 80 - 160     | V. Large       | 2048 - 4096 |                |       |       |       |
|              | Bedrock        |             |                |       |       |       |
|              |                | TOTALS:     | 100            | 100   | 100   |       |

|           |       | Bankfull Depths (ft) | Bankfull Widths (ft) |
|-----------|-------|----------------------|----------------------|
| D 95 (mm) |       |                      |                      |
| D 84 (mm) |       |                      |                      |
| D 50 (mm) |       |                      |                      |
| D 35 (mm) |       |                      |                      |
| D 16 (mm) |       |                      |                      |
| D 5 (mm)  |       |                      |                      |
|           | Mean: | Mean:                |                      |

Notes:

- HHT HHT
- HHT HHT
- No bedrock
  - Large granitic boulders present
  - Substrate in active channel is embedded by Fines and covered with brown algae growth

